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The first documented record of *Acomys dimidiatus* (Cretzschmar, 1826), Eastern Spiny Mouse (Rodentia, Muridae) from Lebanon

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Abstract. We report the first documented record of *Acomys dimidiatus* (Cretzschmar, 1826) from Lebanon. An opportunistic trapping was carried on in Hima Ibl Al Saqi, southern Lebanon for five consecutive nights during the spring and fall of 2022. Four spiny mice were trapped, and their morphometric measurements were recorded. These measurements resemble those documented for this species in other parts of the Middle East. Our new record extends the known distribution of *Acomys dimidiatus* approximately 45 km away from its most northern known geographic range.

Keywords. Geographic distribution, Sherman traps, Middle East

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Introduction

Eastern Spiny Mouse, *Acomys dimidiatus* (Cretzschmar, 1826), is a small, nocturnal species with a wide distribution ranging from the western Sahara to East Africa, Arabia to Iran, and Pakistan (Harrison and Bates 1991; Nowak and Walker 1999; Denys 2017). *Acomys dimidiatus* is well distributed in Palestine (Qumsiyeh 1996), Jordan (Amr et al. 2018), and the Kingdom of Saudi Arabia (Buttiker and Harrison 1982; Abi-Said and Al-Zein 2022). It is also recorded in the United Arab Emirates (Cunningham 2004), Oman (Harrison 1980), and Yemen (Harrison 1972). Despite its widespread distribution in Arabia (Amr et al. 2010), there is a lack of information about the distribution and ecology of *A. dimidiatus* in many parts of its range, including Lebanon. Lewis et al. (1967) reported the presence of this species from Ouadi Jilo in Lebanon (Fig. 2) based on a personal communication with Dr. Makram N. Kaiser, stating that he caught four individuals in Ouadi Jilo near Tyre, but without further details. Hence, Lewis et al. (1967) recommended further studies to document and clarify the status of this species.

Methods

We performed an opportunistic rodent trapping by setting five trapping stations of 15 XLK Folding Live Capture Kangaroo Rat Rodent Sherman traps (7.62 × 9.53 × 30.48 cm) spaced 2–4 m apart and distributed throughout the Hima.

Ibl Es-Saqi Hima, which is roughly 40 km from Ouadi Jilo where *A. dimidiatus* was first reported in Lebanon, is a complex and diverse eumediterranean site located on the western slopes of Mount Hermon (Fig. 2). The Hima comprises several distinct habitats. The 38-ha pine woodland is a dominant feature of the site, in addition to stony hillsides and scrubland habitats which are characterized by rocky outcroppings and sparse vegetation, providing critical habitat for a wide range of plant and animal species.

The traps were set over two seasons, in spring (May) and fall (September) 2022, for five consecutive nights. We set the traps in the afternoon of the first day and checked them at dawn the following day. For bait, we used canary feed mix, sunflower seed, bread, and peanut butter. Rodents caught were euthanized following

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the ethical guidelines for the use of wild animal specimen in research by the American Society of Mammalogists (Sikes et al. 2016), identified, sexed, measured using digital calipers, and weighed using a Pesola Spring Scale (precision ± 0.3%). In addition, muscle tissue was collected and preserved in 96% ethanol for later DNA analysis. We recorded external measurements, including body, tail, head width and length, and ear and foot length. Individuals caught were skinned; nonetheless, the skin was easily broken, and only one specimen was successfully preserved. It was deposited in the Lebanese University Natural History Museum (NHM-LU), Faculty of Sciences II – AlFanar. We cleaned the skulls of the skinned animals and recorded the measurements. The cranial and dental measurements included the greatest length of the skull (GTL), condylobasal length (CBL), zygomatic breadth (ZB), breadth of the braincase (BB), interorbital constriction (IC), postorbital constriction (PC), maxillary cheekteeth (MXC), mandibular cheekteeth (MDC), mandible length (M), tympanic bulla (BU), and rostrum length (RL).

We also recorded morphometric measurements (Table 1) and photographed all trapped individuals (Fig. 1).

Table 1. External measurements of the four caught *Acomys dimidiatus* and the cranial and dental measurements.

	Average	Min.	Max.
Weight (gm)	37.03	27.5	47.5
Total length (mm)	217.04	194.4	233.3
Tail length (mm)	101.16	87.84	110.37
Hind-foot length (mm)	21.70	21.45	22.05
Front-arm length (mm)	21.75	19.12	26.69
Ear length (mm)	17.78	16.00	19.75
Head width (mm)	15.68	15.06	16.45
Head length (mm)	33.95	32.09	35.45
Greatest skull length (mm)	31.97	31.17	33.49
Condylobasal length (mm)	30.35	29.95	31.10
Zygomatic breadth (mm)	14.55	13.80	15.76
Breadth of the braincase (mm)	11.86	11.40	12.28
Interorbital constriction breadth (mm)	5.61	4.97	6.75
Postorbital constriction breadth (mm)	13.62	13.14	13.67
Maxillary cheekteeth length (mm)	4.80	4.76	4.81
Mandibular cheekteeth length (mm)	4.55	4.42	4.64
Mandible length (mm)	16.32	15.65	16.81
Tympanic bulla (mm)	6.60	6.15	7.06
Rostrum length (mm)	15.51	15.21	15.8
Crown area of first upper molar (mm)	2.23	2.15	2.32

Results

***Acomys dimidiatus* (Cretzschmar, 1826)**
Eastern Spiny Mouse
Figure 1

New records (Fig. 2). LEBANON – **Nabatieh Governorate** • Ibl Es-Saqi Hima; 33°21′39″N, 035°37′58″E; 700 m alt; 30.V.2022; M. Abi-Said & E. El Haddad leg.; live trapped; 1 adult ♀, NHM-LU M129-22 • ibid.; 20.IX.2022; 2 adult ♂ • ibid.; 21.IX.2022; 1 adult ♂.

Four *A. dimidiatus* were trapped, one female in the spring and three males in the fall at just one trapping station, which is characterized by a rocky habitat of a Mediterranean forest. The female was larger and older than the three males. This was reflected in the wear of its teeth and its dull pelage color.

Figure 1. *Acomys dimidiatus* trapped at Ibl Es-Saqi Hima.

Identification. *Acomys dimidiatus* is a robust mouse. The pelage color on the back is dark to light brown, and the abdomen is white with a very sharp line of demarcation. White patches are present on the posterior side of the ear base and under the eyes (Fig. 1). Rigid spines cover 75% of the back, from the mid-dorsal region to the base of the tail; at the center of the back, these spines measure 16.56 mm long at the center and 0.51 mm wide on average; the rest of the body is covered with soft fur. The tail, with large and easily visible scales, is shorter (101.16 mm) than the combined head and body length. The ears are large (18 mm long) and without hair. Both palms and soles are naked and yellow-brown. There are three pairs of mammae. The skull has a broad braincase (11.86 mm). The dental formula is 1/1 0/0 0/0 3/3, and the crown area of the first upper molar is very large (on average 2.23 mm). The external measurements, the cranial, and the skull measurements of the trapped individuals are summarized in Table 1.

Discussion

Even though *Acomys dimidiatus* is a typical desert species (Pinheiro et al. 2018), it inhabits a continental and humid climate in Lebanon. In our Lebanese specimens, most morphometric measurements were similar or close to those reported elsewhere in the Middle East (Atallah 1976; Bates and Harison 1991; Mendelsshon and Yom-Tov 1996; Ghadirian et al. 2011; Abi-Said and Al-Zein 2022).

Our new data represents the most northern range of distribution for this species. Its presence in Syria was never been confirmed (Bates and Harison 1991; Shehab et al. 2018). Although there have been several studies on

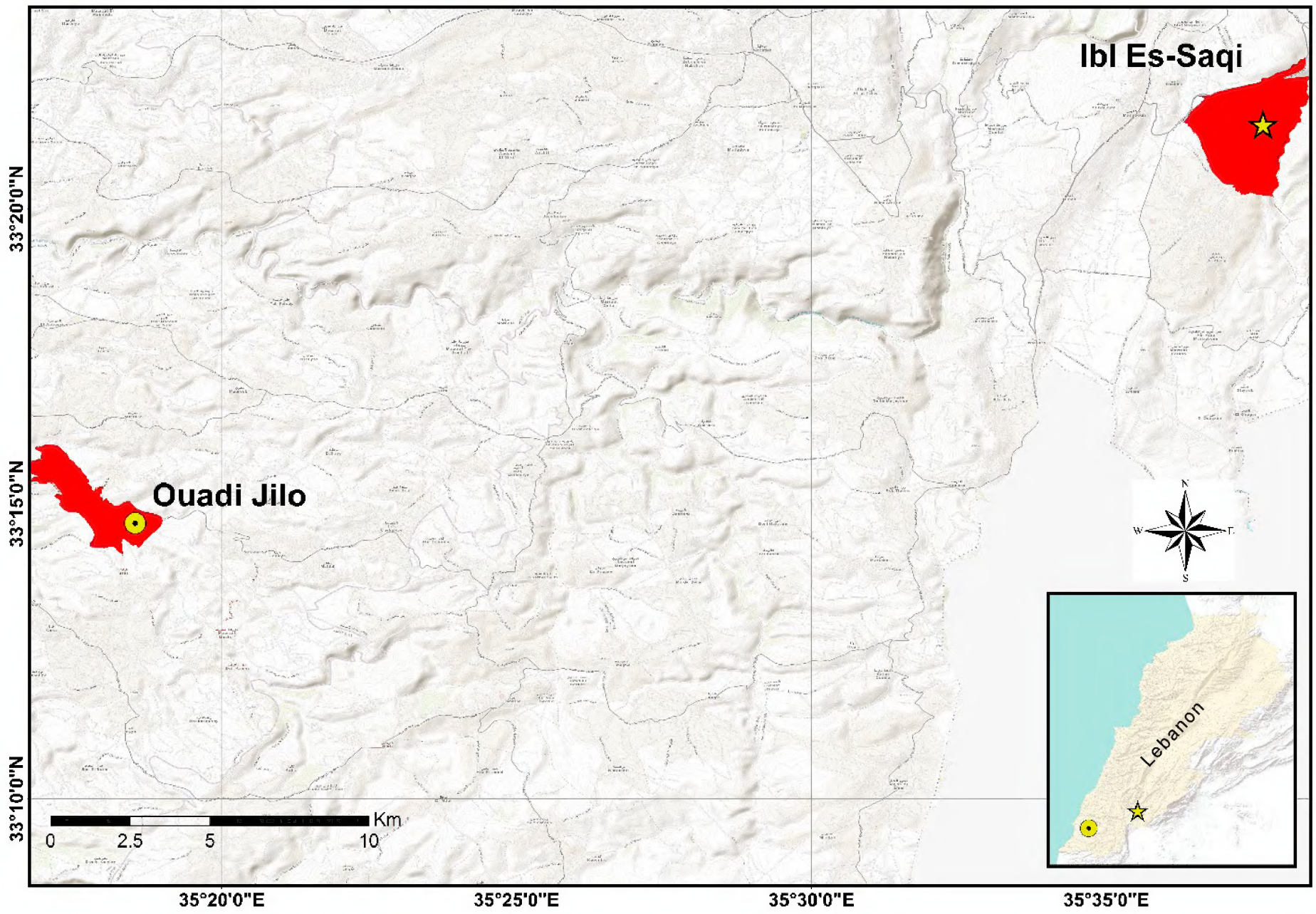

Figure 2. Distribution of *A. dimidiatus* in Lebanon according to Lewis et al. (1967) (yellow circle) and the newly documented site reported here (yellow star).

small mammals recovered from owl pellets from western Beqaa (Abi-Said et al. 2021) and Chaddra-Akkar in northern Lebanon (Abi-Said et al. 2014), *A. dimidiatus* was not recorded in these owls' diet. *Acomys dimidiatus* is a rare species in Lebanon, with restricted geographic distribution. Regarding its conservation status, it is still premature to assess this species of the IUCN national Red List for Lebanon pending further collections. Nonetheless, recommendations will be forwarded to the Ministry of Environment to consider it threatened and protect its habitat until further studies.

It is imperative that additional studies be conducted in the mountain ranges extending northward from southern Lebanon, especially in the arid rocky regions in eastern Lebanon, to comprehensively comprehend the geographic range of *A. dimidiatus*. To discern its taxonomic status and compare the local population with others in the Middle East, genetic and molecular studies are highly recommended.

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Author Contributions

Conceptualization: MAS. Data curation: MAS, EEH. Formal analysis: MAS. Funding acquisition: MAS. Investigation: MAS, EEH. Methodology: MAS. Resources: MAS. Supervision: MAS. Visualization: MAS. Project administration: MAS. Validation: MAS. Writing – original draft: MAS. Writing – review and editing: MAS, EEH.

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